

REMARKS

Reconsideration of this application is respectfully requested.

Independent claims 5, 34 and 44 have been amended in accordance with the examiner's suggestions on page 4 of the January 25, 2005 Office Action. Claim 45 has been incorporated into independent claim 44. The dependency of claims 11, 39 and 46 has been changed to claims 5, 34, and 44, respectively.

New claims 55, 56 and 57 dependent on independent claims 5, 34, and 44, respectively, have been added to more narrowly recite the hydrofluorocarbons.

Entry of claims 55-57 is respectfully requested. Claims 55-57 merely recite a more specific embodiment of independent claims 5, 34 and 44 and do not present new issues or require a new search. In addition, the entry of claims 55-57 will not result in an increase in the highest total number of claims that were previously pending. Thus, entry of claims 55-57 would result in 27 total claims with 3 independent claims, which are less than the 31 total claims and 5 independent claims that were present in the April 7, 2004 Amendment. Therefore, it is respectfully requested that claims 55-57 be entered.

Reconsideration and withdrawal of the restriction requirement is respectfully requested. The restriction requirement has been maintained because of the examiner's position that independent claim 5 is obvious in view of PCT publication WO 96/22129. Applicants respectfully disagree. WO 96/22129 has also been applied to reject claims 2-9, 11, 12, 33, and 52 under 35 U.S.C. §103. This ground of rejection is respectfully traversed.

Independent claim 5 recites a cover gas composition to protect molten magnesium/magnesium alloy from oxidation. The composition of claim 5 consists of a fluorine-containing inhibiting agent in an effective amount to inhibit the oxidation of the molten magnesium/magnesium alloy. The inhibiting agents are selected from the group consisting of difluoromethane, pentafluoroethane, 1, 1, 1, 2-tetrafluoroethane, difluoroethane, heptafluoropropane, dihydrodecafluoropentane,

hydrofluorethers and mixtures thereof, and a carrier gas. Each composition component of claim 5 has a Global Warming Potential of less than 5,000. The volume concentration of the inhibiting agent is in an effective amount to inhibit the oxidation of the molten magnesium/magnesium alloy. The amount of inhibiting agent effective to inhibit the oxidation of the molten magnesium/magnesium alloy ranges up to less than 1% by volume.

In contrast, WO 96/22129 relates to a fire extinguishing composition for Class A, Class B and/or Class C fires (page 2, lines 12-22), not to a cover gas composition to protect molten magnesium/magnesium alloy from oxidation. This is an important distinction because those skilled in the art know that cover gas compositions have a preventive function, are used in much lower concentrations than fire extinguishants, and are used in the form of constant, small, quiescent flows of gas to inhibit or prevent magnesium vaporization and subsequent combustion.

Fire-extinguishing compositions are delivered in huge rushes of gas that are needed to extinguish a fire quickly. The fire-extinguishing component has a significantly larger volume concentration than the fluorine containing inhibiting agent in applicants' claimed cover gas composition.

WO 96/22129 at page 28, lines 24-33 states:

"A constant air flow of 40 L/min is maintained for all trials. The extinguishment concentration, i.e., the concentration of extinguishment composition at which the flame is extinguished is calculated according to the following formula:

Extinguishment Concentration = $[F1/(F1+F2)] \times 100\%$

*where F1 is the composition flow rate in L/min and
F2 is the air flow rate in L/min"*

The inhibiting agent of the claimed cover gas composition is effective in volume concentrations of up to 1%. See the specification at page 3, lines 17-24.

This is in contrast to the much larger volume concentration of the fire extinguishant in WO 96/22129.

The concentration of extinguishing agents listed in WO 96/22129 in Table C on page 31 varies from 2.9 volume % to 12.7 volume %. There is no disclosure in WO 96/22129 relating to cover gas function. Furthermore, as noted earlier, the amount of inhibiting agent in applicants' claimed cover gas composition that is effective to inhibit the oxidation of molten magnesium/magnesium alloy is less than 1 volume %. Thus is significantly lower than the volume concentration of extinguishing agents in WO 96/22129.

The composition containing C_2F_5H referred to by the examiner on pages 2 and 3 of the Office Action that is disclosed in WO 96/22129 on page 14, line 5 represents a co-extinguishing agent "(b)" that is used in combination with at least one mono- or dialkoxy-substituted perfluoroalkane, perfluorocycloalkane, perfluorocycloalkyl-containing perfluorocycloalkane, or perfluorocycloalkylene-containing perfluoroalkane compound. See WO 96/22129 at page 13, line 16 to page 14, line 7.

Similar combinations of components do not appear in applicants' claimed composition. Thus, applicants' claimed composition distinguishes over WO 96/22129 in terms of volume concentration and components.

The examiner's reference to nitrogen, argon and carbon dioxide on pages 2 and 3 of the Office Action that is disclosed in WO 96/22129 at page 12, lines 21-25 relates to optional inert propellant components used with the extinguishant composition and does not remedy the deficiencies of WO 96/22129.

Lastly, the examiner has also admitted in the Office Action of July 2, 2003 at the last two lines of page 3 that WO 96/22129 does not disclose a cover gas composition for molten magnesium.

Accordingly, reconsideration of the restriction requirement and withdrawal of the rejection under 35 U.S.C. §103 is respectfully requested.

Claims 2-9, 11, 12, 33 and 52 stand rejected under 35 U.S.C. §103 as unpatentable over PCT publication WO 91/02564. The examiner maintains that WO 91/02564 discloses fluorinated hydrocarbons such as pentafluoroethane on page 4, lines 1-20, and it would be obvious to one of ordinary skill in the art to select a compound with a low GWP. This ground of rejection is respectfully traversed.

As already noted, independent claim 5 recites a cover gas composition to protect molten magnesium/magnesium alloy from oxidation. The composition of claim 5 consists of a fluorine-containing inhibiting agent in an effective amount to inhibit the oxidation of the molten magnesium/magnesium alloy. The inhibiting agents are selected from the group consisting of difluoromethane, pentafluoroethane, 1, 1, 1, 2-tetrafluoroethane, difluoroethane, heptafluoropropane, dihydrodecafluoropentane, hydrofluoroethers and mixtures thereof, and a carrier gas. Each composition component of claim 5 has a Global Warming Potential of less than 5,000. The volume concentration of the inhibiting agent is in an effective amount to inhibit the oxidation of the molten magnesium/magnesium alloy. The amount of inhibiting agent effective to inhibit the oxidation of the molten magnesium/magnesium alloy ranges up to less than 1% by volume.

In contrast, WO 91/02564 relates to a fire extinguishing composition, not a cover gas composition. The fire extinguishants, such as pentafluoroethane are employed in volume concentrations that range from about 3-15 %. See WO 91/02564 at page 4, lines 22-25. This is significantly larger than the amount of inhibiting agent in applicants' claimed cover gas composition that is effective to inhibit the oxidation of molten magnesium/magnesium alloy, which is less than 1 volume %.

All eleven examples and ten tables of data on pages 7-18 of WO 91/02564 relate to fire extinguishing compositions. The volume of fire

extinguishing agent in the examples ranges from 2.4 volume % to 14.1 volume %.

WO 91/02564 states:

"Where the hydrofluorocarbons of this invention are employed in blends, they are desirably present at a level of at least about 10 percent by weight of the blend. The hydrofluorocarbons are preferably employed at higher levels in such blends so as to minimize the adverse environmental effects of chlorine and bromine containing agents." (page 5, line 33 to page 6, line 2, emphasis added)

"Where hydrofluorocarbons alone are employed, best results are achieved with agent levels of at least about 5% (v/v)." (page 6, lines 25-28)

WO 91/02564 is also not concerned that each component of its fire extinguishing composition meet the Global Warming Potential requirement of less than 5,000, because the chlorine or bromine containing fire extinguishing agents disclosed at page 5, lines 22-32 do not meet this requirement.


Lastly, the examiner admitted in the July 2, 2003 Office Action at page 3, last two lines, that WO 91/02564 does not disclose a cover gas composition. Therefore, reconsideration and withdrawal of this ground of rejection is respectfully requested.

In view of the above arguments and amendments, the allowance of this patent application is respectfully solicited.

Respectfully submitted,

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